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Via Electronic Transmittal and Overnight Courier

Ms. Carole Petersen
United States Environmental Protection Agency
New Jersey Remediation Branch
Region 2
290 Broadway
New York, New York 10007-1866

137005.001

Subject: Final Response to USEPA Comments
Draft Remedial Investigation Report for the LCP Chemicals, Inc. Superfund
Site, Linden, New Jersey

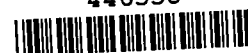
Dear Ms. Petersen:

This letter has been prepared on behalf of our client, ISP Environmental Services Inc. (IES), to establish final responses regarding the USEPA's comments on the report titled "Draft Remedial Investigation Report, LCP Chemicals, Inc. Superfund Site, Linden, New Jersey," (Brown and Caldwell, September 2008), hereinafter referred as the DRIR. The comments provided address the proposed revisions of the text and associated tables and figures of the DRIR. The Draft Human Health Risk Assessment (DHHRA) and Draft Baseline Ecological Risk Assessment (DBERA) contained in DRIR Appendices P and Q, respectively, are not addressed in this letter. This letter addresses only the outstanding comments that have not been resolved in prior responses. However, all of the comments, even those that have been previously resolved, are included on the accompanying comment tracking table.

Responses to the USEPA comments are provided herein. For convenience, we have included the original USEPA comments in **bold face** that were contained in the letter from USEPA dated January 12, 2009. In addition, multiple responses are provided, herein, from the following sources:

- Original Responsible Party (RP) responses contained in a letter dated March 19, 2009.
- USEPA responses contained in an e-mail dated August 28, 2009.
- 2010 RP responses contained in a letter dated March 5, 2010.
- 2012 RP responses contained in this letter

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Many of the responses provide text additions and/or modifications that are proposed to be included in the Final RIR. In addition, the comment tracking table has been provided to document previously resolved comments and the current resolution of outstanding comments.

It is anticipated that the final RIR document will be prepared for approval by USEPA after the receipt of the final comments on the DBERA and RIR. A final RIR will be issued once the RA comments have been received and once we have received agency concurrence regarding the proposed modifications of the text, figures, and tables as presented herein, the responses to the RA comments, and Sections 6.4 and 9, as described above.

General Comments

2. ***Unless the overburden and bedrock groundwater are reclassified, Site drinking water should be evaluated as Class II-A, this will mean modifying portions of the existing RI, and Class II-A criteria would have to be considered when evaluation the extent of groundwater contamination.***

Original RP Response: The petition to reclassify the groundwater within the overburden water-bearing zone as Class III-B will be retracted. Accordingly, the Class II-A groundwater quality criteria will be utilized for the evaluation of groundwater quality within the overburden water bearing zone in the final RIR. However, as discussed further in proposed revisions to Section 2.8.2 (see response to Specific Comment 5), the classification does not mean that the water could ever serve as potable supply consistent with the classification.

The bedrock groundwater classification at the LCP site has been accepted as Class III-B by NJDEP. Messrs Frank Faranca and Ian R. Curtis of NJDEP stated in a letter dated February 27, 2009, that, "The Department concurs with ISP's conclusion that the Passaic bedrock groundwater specifically as it underlies these [ISP and LCP] sites is a Class III-B aquifer" as presented in the document titled "Request for Class III-B Aquifer Designation, LCP Chemicals Inc. Superfund Site and ISP ESI Linden Site, Linden, New Jersey" (Brown and Caldwell, April 2008). Use of site specific groundwater quality criteria developed in accordance with N.J.A.C. 7:9C 1.7(f) will be utilized for the evaluation of groundwater quality within the bedrock water bearing zone in the final RIR.

Alternative groundwater quality criteria (AGWQC) for the bedrock water bearing zone were presented in the Draft RIR that were intended to address the potential groundwater impacts to surface water quality in accordance with N.J.A.C. 7:9C 1.7(f)1, as it has been shown that groundwater from the site discharges to surface water bodies. These AGWQC will be substantially revised to address the various specific agency comments presented herein, as well as comments received from the NJDEP and any additional pending agency comments regarding the Risk Assessment documents. The revised AGWQC for the bedrock water bearing zone will be presented in a separate deliverable that will eventually become a new appendix to the final RIR.

USEPA E-mail Response: Sounds acceptable, but EPA/DEP need to be ok with the AGWQC.

2010 RP Response: The petition to reclassify the groundwater within the overburden water-bearing zone has been retracted. NJDEP has informed IES that it will not allow development of AGWQC for the bedrock water-bearing zone even though NJDEP regulations (N.J.A.C. 7:9c-1.7(f)) provide for it when an aquifer has been designated Class iii-b. Because of this, there will not be a New Jersey applicable or relevant and appropriate requirement (ARAR) for the bedrock water-bearing zone.

2012 RP Response: IES had sent a final request to NJDEP for a meeting and to provide guidance for the development of AGWQC for the bedrock water-bearing zone on July 19, 2012. At the current time, the NJDEP has no method to calculate the AGWQC for class IIIB bedrock groundwater. Therefore, it has been agreed the New Jersey Surface Water Quality Standards for saline waters¹ per N.J.A.C. 7:9B will be used as default ARARs for comparison of bedrock groundwater results until such a method has been developed by NJDEP for calculating site-specific AWQC's.

3. *The RI must clearly state whether the extent of the Site's contamination has been delineated.*

Original RP Response: The final RIR will include text that will be included in the discussions of each environmental medium (subsections 6.2 through 6.9) stating the following:

The horizontal and vertical delineation of site related constituents for [medium] is adequate to perform the analysis and selection of remedial alternatives as part of the Feasibility Study (FS). Additional delineation of [medium] may be performed, as necessary, as part of a Pre Design Investigation (PDI).

USEPA E-mail Response: Looks ok. Perhaps Brown & Caldwell could include the GW data from the GAF site if the GW boundary is north of LCP, as it appears. Also, let's keep in mind that one area that will need some analysis is the "ditch" area. We may be able to get those samples courtesy of Conrail.

2010 RP Response: Groundwater data are provided to demonstrate the existence of mercury-impacted groundwater at the adjacent GAF site. These include a tabulation of mercury data in groundwater and maps of the distribution of filtered mercury water quality data in the overburden and bedrock water-bearing zones. These figures and table (attached) will be included in the final RIR.

A memo from Brown and Caldwell dated September 10, 2009, has been provided to USEPA describing proposed sampling of the ditch area. IES anticipates that this work will be completed by Conrail and the data will be included in the final RIR.

2012 RP Response: The off-site ditch investigation was conducted by IES in August 2011. Pertinent inserts and edits to the DRIR relative to the off-site ditch data were provided for agency review in December 2011. As necessary, additional delineation activities in the northern off-site ditch will be conducted as part of a Pre-Design Investigation (PDI). Also, we believe the language in the initial response is appropriate such that it has been incorporated into the FS.

¹ The Arthur Kill at the LCP site is classified as "SE3" which is saline waters of estuaries designated for secondary-contact recreation.

Specific Comments on the Executive Summary

2. **ES2 1st para, last sentence. "Each of these other site" Please remove that sentence. 3. ES2 2nd para. Please temper it a bit. Example "Other various chemicals ... may also be from regional..." Etc**

Original RP Response: The referenced sentence will be modified as follows:

Each of these other constituents, although site related, show much less degree of concentration elevation than mercury and are considered secondary contaminants of concern.

USEPA E-mail Response: This sentence implies that if other contaminants have concentrations at levels "much less" than Hg that fact, in and of itself, means they are of secondary concern. A chemical is considered of concern based not simply on its concentration relative to other chemicals, but rather on the inherent toxicity of the chemical based on its concentration relative to risk levels or regulatory clean-up levels. In that light, this revised sentence is unacceptable and should be deleted.

This sentence will be deleted and the following will be inserted in the RI:

"Contamination Sources

The RI results are summarized by the finding of the widespread presence of mercury in various environmental media as a result of manufacturing activities at the LCP site. Other contaminants potentially related to chlorine production are also found, including hexachlorobenzene (HCB), polychlorinated naphthalenes (PCNs), and polychlorinated dibenzo furans (PCDFs). Polychlorinated biphenyls (PCBs) are also a site-related constituent due to their potential presence in electrical equipment on the site. Each of these other site-related constituents is present at levels much less than those of mercury."

As stated in the response to Executive Summary No. 1, above, the statements in the 2nd paragraph related to the presence of various metals and PAHs in Historic Fill are accurate and well supported, and we recommend that they not be revised.

Again, please revise based on the April 29th conference call.

2010 RP Response: Please refer to our response to specific comment on the executive summary #1 above.

2012 RP Response: The language for this section will be revised as follows:

"Contamination Sources

The RI results are summarized by the finding of the widespread presence of mercury in various environmental media as a result of manufacturing activities at the LCP site. Other contaminants potentially related to chlorine production are also found, including hexachlorobenzene (HCB), polychlorinated naphthalenes (PCNs), and polychlorinated dibenzo furans (PCDFs). Polychlorinated biphenyls (PCBs) are also site-related

constituents due to their potential presence in electrical equipment on the site. These other site-related contaminants are co-located with mercury; however, the frequency and magnitude of exceedances of soil remediation standards is, respectively, less than that of mercury.

Contamination is also present as a result of the prior placement of historic fill materials. Contaminants that are ubiquitous in fill materials include metals/metalloids (e.g., lead, chromium, and arsenic), and polycyclic aromatic hydrocarbons (PAHs) as a result of the common practice of using combustion residues (e.g., coal ash and slag) as fill. Other contaminants in the historic fill are consistent with sources of industrial fill from neighboring properties (e.g., duPont, GAF) and include arsenic and chlorobenzenes. Other various chemicals, including dioxins, are also found from regional sources such as air deposition and sediment transport. While these regional contaminants are not considered to be related to site operations, they are co-located with operations-related contamination and are considered to be Contaminants of Potential Concern (COPCs). The COPCs are carried through the FS.

Other Specific Comments

- 14. *Page 5-6 and 5-8. It's unclear in the text whether the groundwater flow direction in the bedrock zone is affected by tidal influences. What were the tidal stages when bedrock groundwater elevations were measured?***

Original RP Response: Figures 5 16 and F 5 17, Hydrograph for Overburden Water-Bearing Zone" and "Hydrograph for Bedrock Water-Bearing Zone," respectively, were inadvertently not included in the draft RIR. Figure 5 17 revealed that while the bedrock water bearing zone is tidally influenced, the magnitude of this influence is relatively small such that the interpretation of groundwater flow direction in the bedrock would not be affected regardless of when the water measurements were made relative to the tidal cycle. The overburden groundwater levels are not tidally influenced with the minor exception of a single well, MW-6S. The missing figures are attached.

USEPA E-mail Response: Ok, but would it be possible to include GW flow contour maps for both high and low tidal periods?

2010 RP Response: Our initial response is modified below. Additional text has been added.

Figures 5-16 and 5-17, "Hydrograph for Overburden Water-Bearing Zone" and Hydrograph for Bedrock Water-Bearing Zone," respectively, were inadvertently not included in the draft RIR. Figure 5-17 revealed that some of the bedrock water-bearing zone is tidally influenced to varying degrees. For example, no tidal fluctuations are observed in the bedrock wells located closest and furthest from the tidal surface water bodies, respectively, MW-6D and MW-17D. Other wells in which tidal influences are observed, MW-11D and MW-23D, typically revealed tidal fluctuations of less than 0.2 feet. The relatively small magnitude of this influence compared to the observed head differences between wells is such that the interpretations of groundwater flow direction in the bedrock would not be affected regardless of when the water measurements were made relative to the tidal cycle. The overburden groundwater levels are not tidally influenced with the minor exception of a single well, MW-6S (Figure 5-16). The missing figures are attached.

Groundwater level data corresponding to high and low tidal periods were not collected such that the requested maps cannot be generated. The time lag between the tidal water body and the well would necessarily be different for each well. Therefore, it would be necessary to perform tidal time-lag studies in each well before it would be possible to obtain water level data at specific times that correspond to high and low water tidal levels in each well. As stated above, the influence of tidal fluctuations on bedrock groundwater levels is sufficiently small such that studies are not required for an adequate understanding of groundwater flow in the bedrock water-bearing zone.

2012 RP Response: IES requests acceptance of the above concept on the 2010 response provided above.

- 15. Page 5-6 (and 9-3). The conclusion that the "existing bedrock groundwater extraction system at the GAF site provides hydraulic capture of the bedrock water-bearing zone beneath the entire LCP site is premature. Typically capture zones in bedrock are determined with multiple lines of evidence (i.e., groundwater elevations, contaminant concentrations over time) given the complexity of flow in fractured systems. Therefore, the statement should be modified to reflect the uncertainty that exists at this time.**

Original RP Response: Sufficient evidence exists to demonstrate that the existing bedrock extraction system at the GAF site provides hydraulic capture of bedrock groundwater beneath the LCP site. The final RIR text will be expanded to provide multiple lines of evidence in this regard including discussion of the bedrock behavior as a porous-medium equivalent, an expansion of the description of the bedrock potentiometric surface under pumping conditions, and clarified text regarding the distribution of bedrock groundwater quality constituents at the LCP site with respect to the bedrock extraction wells.

Text insert at the end of Section 5.2.1:

The data indicate that the bedrock water-bearing zone behaves as a "porous medium equivalent" from the standpoint of groundwater flow. This conclusion is based on the relatively high bedrock hydraulic conductivity (Section 5.2.2.3) indicating the development of bedrock fractures in a sufficient density so as to be interconnected and the lack of apparent anomalies in the potentiometric data. Despite the observed areal anisotropy in likely response to a slight preferential orientation of bedrock fracturing (Section 5.2.3.3), the data do not suggest the presence of fracture controlled groundwater flow in the bedrock water-bearing zone.

Text insert prior to the last paragraph in Section 5.2.3.3:

An additional important observation is that bedrock groundwater flow, under pumping conditions, is observed to sweep through the western portion of the LCP site from the GAF site and then back to the GAF site to be captured by extraction well DEW 4A. This groundwater flow onto the LCP site likely originates from beneath the "Old Landfill" located in the south central portion of the GAF site (Eckenfelder, 1991). Under non-pumping conditions (Figure 5 11), groundwater within the western portion of the LCP site enters the site from other properties to the southwest.

The last paragraph in Section 6.4.2.1 will be replaced with the following paragraphs in the final RIR:

The only bedrock wells that contain detectable levels of mercury are located northwest of the LCP production area (MW 17D, MW 18D, and MW 20D) and contain mercury concentrations ranging up to 10.9 µg/L. Under pumping conditions, groundwater has been demonstrated to originate from the adjacent GAF site, sweeping through the western portion of the LCP site in which these wells are located, and then back to the GAF site to be captured by extraction well DEW 4A (Section 5.2.3.3). Relatively high dissolved mercury concentrations have been observed in nearby wells on the adjacent GAF site, which are the likely source of the mercury in the three LCP bedrock wells. These data demonstrate that the only dissolved mercury detected in bedrock at the LCP site originates from the GAF site.

Evidence of the mercury mobility in bedrock groundwater is provided by the apparent relative mercury solubility differences between the LCP and GAF sites. The mercury sources in soil at the LCP site have been demonstrated to consist primarily of insoluble forms (Section 6.1.1), which is consistent with the generally low levels of dissolved mercury detected in overburden groundwater at the LCP site. Contrasted with this is that mercury at the GAF site has been observed at concentrations that are orders of magnitude higher than at the LCP site, ranging up to 2,520 µg/L, suggesting the presence of much more soluble forms of mercury at the GAF site. In summary, the soluble mercury from the GAF site is the likely source of mercury in the LCP bedrock wells and this mercury is being captured by the GAF groundwater extraction system.

USEPA E-mail Response: Please clarify that the upper portion of the bedrock may be considered an equivalent porous (EPM) due to a higher density of fractures in this "weathered" portion of the bedrock. With depth, the generally accepted model used for bedrock formations of the Newark Basin is the leaky, multiunit, aquifer system (LMAS), in which groundwater flow is highly controlled by bedding plane partings with leakage across units through near-vertical joints or fractures.

The interpretation that groundwater flow in the bedrocks sweeps through the western portion of the LCP site from the GAF site and then back to the GAF site to be captured by extraction well DEW-4A will likely require additional supporting information and evaluation, in particular if this is to be used in the Feasibility Study to support a pump and treat or containment remedy for the LCP site.

EPA does not necessarily agree with the assertion that the "only dissolved mercury detected in bedrock at the LCP site originates from the GAF site." Mercury in the soils at the LCP site may be acting as a source to groundwater at the LCP site.

2010 RP Response:

A. IES will revise the text insert as follows:

Text insert at the end of Section 5.2.1:

The data indicate that the upper portion of the bedrock water-bearing zone investigated during the LCP RI behaves as a "porous medium equivalent" (EPM) from the standpoint of groundwater flow. ~~this conclusion~~ The EPM model is based on the relatively high bedrock hydraulic conductivity (Section 5.2.2.3) indicating the development of bedrock fractures in a sufficient density so as to be interconnected and the lack of apparent anomalies in the potentiometric data. Despite the observed areal anisotropy in likely response to a slight preferential orientation of bedrock fracturing (Section 5.2.3.3), the data do not suggest the presence of fracture controlled groundwater flow in the bedrock water-bearing zone.

B. IES will add the following text to the text added in the letter after the existing text insert for Section 5.2.3.3.

We believe that the data from the existing bedrock monitoring well network, at the LCP and GAF sites, provides a technically rigorous characterization of the groundwater flow pattern that is established as a result of pumping from extraction well DEW-4.

C. IES will revise the existing text insert, as follows:

The last paragraph in Section 6.4.2.1 will be replaced with the following paragraphs in the final RIR:

The only bedrock wells that contain detectable levels of mercury are located northwest of the LCP production area (MW-17D, MW-18D, and MW-20D) and contain mercury concentrations ranging up to 10.9 µg/L. Under pumping conditions, groundwater has been demonstrated to originate from the adjacent GAF site, sweeping through the western portion of the LCP site in which these wells are located, and then back to the GAF site to be captured by extraction well DEW-4A (Section 5.2.3.3). Relatively high dissolved mercury concentrations have been observed in nearby wells on the adjacent GAF site, which is the likely source of the mercury in the three LCP bedrock wells.

These data demonstrate that the only dissolved mercury detected in bedrock at the LCP site originates from the GAF site.

Evidence of the mercury mobility in bedrock groundwater is provided by the apparent relative mercury solubility differences between the LCP and GAF sites. The mercury sources in soil at the LCP site have been demonstrated to consist primarily of insoluble forms (Section 6.1.1), which is consistent with the generally low levels of dissolved mercury detected in overburden groundwater at the LCP site. Contrasted with this is that dissolved mercury at the GAF site has been observed at concentrations that are orders of magnitude higher than at the LCP site, ranging up to 2,520 µg/L, suggesting the presence of much more soluble forms of mercury at the GAF site. Furthermore, none of the LCP bedrock wells containing detectable mercury were located within the production area and/or areas that contained detectable mercury in overburden groundwater. Only bedrock wells in the NW portion of the site had detectable mercury. In summary, the soluble mercury from the GAF site is the likely source of mercury in the LCP bedrock wells and this mercury is being captured by the GAF groundwater extraction system.

2012 RP Response: IES has requested concurrence with the RIR text modifications presented above.

- 17. Section 6.1, Soil:** *This section indicates that NJ Non-Residential Direct Contact Soil Remediation Standards were used as benchmarks for the characterization and relative distribution of chemical constituents in soil. Contaminant concentrations in soil also need to be screened against Impact to Groundwater Soil Cleanup Criteria. Also, they should be screened against Residential Direct Contact Soil Remediation Standards.*

Original RP Response: Soils were not screened against the Groundwater Soil Cleanup Criteria given the fact that impacts to groundwater were evaluated on the basis of the collection and analysis of actual groundwater quality data. The Residential Direct Contact Remediation Standards are not applicable to the site since the site is industrial and is located within an industrially zoned area that will not be developed for residential use. Accordingly, we do not recommend revising the text and tables in this section in the final RIR.

USEPA E-mail Response: It's ok not to screen against Residential numbers (assuming DEP is ok with it), however the RI will need to screen using impact to groundwater numbers in soil, regardless of the concentrations found in the groundwater.

2010 RP Response: The soil data collected from samples in the unsaturated zone will be compared to the NJDEP's default impact to groundwater soil remediation screening levels. It should be noted that these numbers are not standards and were not used in the draft human health risk assessment. The following revision will be made to Section 6.1.

6.1 SOIL

Soil samples were collected during Phases I and II through the full thickness of the overburden soils that underlie the site, including a large number of surficial (0-2 ft) soil samples. The soil samples were obtained as surficial grab samples, shallow direct-push borings, deep borings by hollow-stem auger and fluid rotary drilling and horizontal borings.

The New Jersey Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) are used as benchmarks for the characterization and relative distribution of chemical constituents within surficial and subsurface soils. The NRDCSRS are promulgated remediation standards [N.J.A.C. 7:26D] that are based on theoretical exposures via accidental human ingestion, dermal contact, and/or inhalation of soils. The NRDCSRS represent concentrations below which NJDEP would not have concern about incidental human contact. The unsaturated zone soil data are also compared to default impact to ground water (IGW) soil screening levels. The IGW levels are not standards, but are default guidance values intended to be used "where no site specific information is available." Since there are ample available groundwater quality data for the site, these screening levels are simply presented for reference.

Soil quality maps include data from both Phase I and Phase II and are separated into the four (4) depth ranges that reflect the three (3) distinct lithologies found on the site: surficial soil (0 - 2 Feet), deep anthropogenic fill (> 2 feet), tidal marsh deposits, and glacial till. In situations in which there are multiple samples within a single lithology (e.g., deep fill) the sample with the highest constituent is displayed. The "low marsh"

soils may, in part, represent the geologic surface exposure or "outcrop" of the tidal marsh deposits along South Branch Creek and are included on the constituent maps of the tidal marsh deposits. However, the low marsh soils are also separately described in Section 6.2.

The constituents, for which soil quality maps were prepared, were selected on the basis of the relative frequency of exceedances of their respective NRDCSRS and relevance as contaminants of concern as related to the site. Descriptive statistics for soil are presented in Tables 6-1A through 6-1DE and the exceedances of the NRDCSRS are presented in Tables 6-2A through 6-2DE, broken into the distinct layers as described above.

2012 RP Response: IES believes the 2010 response is appropriate and requests concurrence with USEPA.

28. Page 6-12, PCDDs/PCDFs -The comparison of the geometric mean of the TEQs in South Branch Creek (58 pg/g) with the value for a single sample (223 pg/g) in the Arthur Kill is not reasonable. Since there is only one sample from the Arthur Kill, it would be more informative and balanced to compare and discuss the range of concentrations in the South Branch Creek with the single sample from the Arthur Kill. Also, the distribution of PCDFs and PCDDs are discussed in terms of "landward" low marsh soils and low marsh soils "near the Arthur Kill. The discussion references the results in Table 21, which doesn't identify which samples are considered "landward" or "near the Arthur kill." Please identify in the table specific samples that are being discussed in the text.

Original RP Response: Agreed. The final RIR will contain an expanded discussion of the PCDD/PCDF results and reference locations. The term "landward" in this instance was meant to describe sample transects that are closer to the center of the site and the operations. The confusion wasn't really with the dictionary definition of the term "landward" but with how landward was determined for this specific site. Simply indicating which samples are considered "landward" and which "near the Arthur Kill" should resolve the confusion. Due to the tidal nature of South Branch Creek along its entire course, we felt the term "upstream" was not appropriate. The revised text will clarify this as follows:

The low marsh soil samples were analyzed for 17 PCDDs/PCDFs, 21 pesticides and herbicides, 51 non-PAH SVOCs, and 46 VOCs. Each of the low marsh soil samples collected from South Branch Creek and the Arthur Kill contained detectable dioxins and furans (all analyzed compounds) (Table 6-17). While there is a high total TEQ found in Transect C, the remaining samples collected along South Branch Creek revealed a significantly lower total TEQ than the sample taken along the Arthur Kill (223 pg/g). Note: Transect E was 188 pg/g – it's unclear if this would be substantially lower. Table 6 21 shows a summary of individual sample results for PCDDs/PCDFs and TEQs in low marsh soil. The PCDD/PCDF TEQ results are presented in Figure 6 17. As discussed previously in Section 6.1.8, PCDFs are attributed in part to site operations, as reflected in the predominance of PCDFs in the TEQ in low marsh soils closer to the production areas of the LCP site. Low marsh

soils near the Arthur Kill reflect a greater TEQ contribution of PCDDs from regional sources. This pattern of regional contamination [Note: *How large is the "region" and what does it incorporate?*], attributable to regional influences, is similar to that observed in sediment (see Section 6.6.3.3).

USEPA E-mail Response: The "pattern of regional contamination" argument isn't all that convincing. For example it appears there may be higher PCDDs in sediments in the middle of the Creek than closer to the Kill even though the ration of PCDD/PCDF may be higher near the Kill. Also, as there are studies suggesting that PCDDs/PCDFs are associated with chlor-alkali plants (Xu, et al., 2000; Hansson et al., 1997; Svennson et al., 1993) they cannot be dismissed as Site-related contaminants.

2010 RP Response: A Brown and Caldwell memorandum dated August 25, 2009, was provided to USEPA via email on August 28, 2009. This memo details the review of the above citations as well as others which study the presence of PCDDs/PCDFS associated with chlor-alkali facilities. These studies support the data obtained at the LCP site. PCDFS appear to be associated with chlor-alkali facilities. PCDDs do not. Additional sampling would be necessary to perform statistical analysis.

2012 RP Response: It is our understanding the USEPA agrees with the 2010 statement above.

- 36. Pages 6-19 to 6-20, Section 6.4.3 Organics -The text states that "organic compounds are not known to have been used in the production at the LCP site" and VOC contamination is attributed to the nearby facilities or the historic fill. However, on page, 2-14 in Section 2.5.2, the report states that tanks were used to store petroleum as well as other compounds. Therefore, the VOCs could be related to activities on the LCP site, not the adjacent facilities.**

Original RP Response: With the exception of benzene, most of organic constituents referenced in the text are not related to fuel. As such, the statements are correct with respect to site-related constituents. Additional clarification will be provided in this section of the final RIR as follows.

Aside from known and suspected storage of petroleum and heating oil in the vicinity of the Linde Hydrogen Plant, organic compounds are not known to have been used in production at the LCP site. The highest VOC/SVOC detections are attributed to off-site sources, including the adjacent NOPCO site and the former GAF site. However, many of these same compounds are also found in the soils at the site and wide distribution within the overburden groundwater may be attributed, in part, to dissolution from the anthropogenic fill. There does not appear to be a pattern of VOC contamination in groundwater relating to the Linde Hydrogen Plant, indicating that storage tanks in that area of the property do not appear to have contributed to observed VOC concentrations. The bulk petroleum product terminal facilities have been located in close proximity to the LCP site for more than 50 years and have likely contributed to regional contamination by VOCs and other fuel-related compounds.

USEPA E-mail Response: The data presented do not support the assertion that "the highest VOC/SVOC detections are attributed to off-site sources" or to "dissolution from the anthropogenic fill." The LCP site is an industrial site with a varied history of known and suspected releases and storage of materials such as petroleum products. Additional investigations, such as offsite sampling of soil and groundwater would be necessary to support claims such as the nearby petroleum terminal facility is a contributor to VOC/SVOC contamination at the LCP site.

2010 RP Response: The USEPA's comment is so noted. These compounds have been evaluated in the draft human health and draft baseline ecological risk assessments.

2012 RP Response: It is our understanding the USEPA agrees with the 2010 statement above.

39. Page 6-22 3rd para. 1st sentence. "The CCC and CMC values" Human Health surface water standards should also be mentioned here, Human Health criteria is based on total recoverable levels.

Original RP Response: Agreed. These criteria will be referenced in the text of this section of the final RIR. However, these criteria have limited relevance to South Branch Creek, which does not support fish of sufficient size to serve as a human dietary source. Pursuant to discussions with Mr. Michael Sivak of the USEPA, the HHRA did not include the human fish ingestion pathway [Note: EPA will be requesting additional information in the HHRA RTC regarding the creek and the likelihood of the presence of consumable fish]. Therefore, the water quality criteria based on human health does not need to be added to all of the surface water results tables.

USEPA E-mail Response: Regardless of the pathways used in the HHRA, the NJDEP Surface Water Standards applicable to South Branch Creek are ARARs and they include Human Health numbers. For example the most stringent applicable standard for total recoverable mercury for South Branch Creek is 0.051 ppb. The tables for surface water need to be revised to include human health standards when they are more conservative than CMC or CCC values.

2010 RP Response: There were no consumable fish observed in SBC. A column will be added to include human health criteria to the appropriate table(s) in the RI Report.

2012 RP Response: It is our understanding the USEPA agrees with the 2010 statement above.

40. Page 6-22, Methyl Mercury, last sentence - The conclusion does not seem appropriate, particularly in light of the fact that there is no empirical evidence cited regarding the rate of mercury methylation at the site or Old Place Creek. The inference is that the methyl mercury concentrations detected in surface water are proportional to the rate of methylation. While this is plausible, there are many factors that affect the concentration of methyl mercury observed in surface water including demethylation reactions, volatilization, biological uptake, etc. At best the data may "suggest" a lower rate of mercury methylation in Old Place Creek. Please consider revising the conclusion

Original RP Response: The following clarification will be added to Section 6.5.1.1:

As discussed further in Section 7.1.6, various factors affect the observed methylmercury presence in any medium. However, the net methylation rate (which accounts for both formation and removal mechanisms) in Old Place Creek surface water is, empirically, several fold higher than that in South Branch Creek. In South Branch Creek and the Arthur Kill, methyl mercury represented between 0.05 and 0.16 percent of total mercury; in Old Place Creek, the percentage of mercury in the methylated form ranged from 0.35 to 0.51 percent. A similar pattern is observed in sediment, with South Branch Creek/Arthur Kill samples typically exhibiting less than 0.05 percent methylmercury, while Old Place Creek samples (except W 1 and W 2) contained 0.1 to 0.39 percent methylmercury. *[Are these rates significantly different from each other? Small amounts of methylmercury can impact an aquatic ecosystem.]* These data do not necessarily reflect the initial rate of methylation, but do suggest that overall the South Branch Creek system is producing a lower net rate of mercury methylation.

USEPA E-mail Response: The data were not collected for the purpose of determining methylation rates; conclusions on methylation cannot be made based solely on MeHg concentrations. Again, at best the data may suggest a lower rate.... Without data on sediment characteristics and sulfate reducing bacteria populations and based on the high levels of mercury found in and around the creek, it's unlikely that MeHg can be dismissed as a COPC regardless of these rate estimates.

2010 RP Response: MEHG was not dismissed as a COPC. The significance of small differences in methylation rates is unknown. It is evaluated as a COPC in the draft human health and draft baseline ecological risk assessments.

2012 RP Response: It is our understanding the USEPA agrees with the 2010 statement above.

43. Page 6-28, PCBs - The fact that 16 percent of the samples exceed the ER-M threshold suggests that potential ecological impacts are likely. This is not consistent with the claim that there "is not a PCB contamination issue in South Branch Creek". Please provide additional explanation as to why there is no PCB issue in the South Branch Creek.

Original RP Response: Most PCB congeners were not detected at all in South Branch Creek sediments. The average total PCB concentration was approximately 0.2 ppm, which is relatively low considering the overall industrialized nature of the area. We recommend that no additional discussion be provided in the final RIR.

USEPA E-mail Response: *Whether most PCB congeners were detected doesn't matter. The total PCB concentration is less important than the fact there were concentrations two orders of magnitude over the ER-L and ER-M. There needs to be some additional discussion on the PCB issue.*

2010 RP Response: The following section will be edited in the RIR.

6.6.3.1.1 PCBs

Sediments collected from South Branch Creek had PCBs detected in 16 samples. Those PCBs were identified as Aroclor 1254 and Aroclor 1260 (Table 6-40, Figure 6-35A through 6-35D) which are the same as what was observed in the on-site soils. The ERL and ERM concentrations for Aroclor 1254 Total PCBs are 0.023 mg/kg and 0.18 mg/kg,

respectively. Of the samples with detectable PCBs, 18 percent exceeded the ERL and ERM threshold; however, as Long, et al. (1995) pointed out in the original ERL/ERM documentation paper, the relationship between PCB concentrations and effects are "relatively weak."

None of the Arthur Kill sediment samples had detectable PCB concentrations. In the Transect A Area, Aroclor 1254 was present, while in the locations closer to the Arthur Kill, PCBs were identified as Aroclor 1260. The maximum observed concentrations was 2.7 mg/kg and 1.1 mg/kg in the surficial samples at station SED-8 and SED-2, respectively. Other PCB results in South Branch Creek were well below 1 mg/kg, and the deeper samples contained less than the shallower (0.5 foot) samples.

Overall, the Transect A Area contains slightly higher PCBs than the remainder of South Branch Creek. This pattern, and the presence of Aroclor 1254 (found upland), suggests that there could be a contribution from site sources, although, as discussed in Section 2.6.1, other sources have historically discharged to this area as well. Additionally, regional studies of the Newark Bay estuary, as discussed in Section 2.10, have shown PCBs to be ubiquitous at concentrations similar to those found in South Branch Creek (see Figure 2, attached). These results indicate that while there is the possibility of PCB contributions to South Branch Creek in the furthest upland transects, overall the PCB impacts are not significantly elevated beyond regional conditions present throughout the Newark Bay estuary.

2012 RP Response: The above language has been edited as follows.

6.6.3.1.1 PCBs

Sediments collected from South Branch Creek had PCBs detected in 16 samples. Those PCBs were identified as Aroclor 1254 and Aroclor 1260 (Table 6-40, Figure 6-35A through 6-35D) which are the same as what was observed in the on-site soils. The ERL and ERM concentrations for Aroclor 1254 Total PCBs are 0.023 mg/kg and 0.18 mg/kg, respectively. Of the samples with detectable PCBs, 18 percent exceeded the ERL AND ERM threshold. ~~However, as Long, et al (1995) pointed out in the original ERL/ERM documentation paper, the relationship between PCB concentrations and effects is "relatively weak."~~

None of the Arthur Kill sediment samples had detectable PCB concentrations. In the Transect A Area, Aroclor 1254 was present, while in the locations closer to the Arthur Kill, PCBs were identified as Aroclor 1260. The maximum observed concentrations was 2.7 mg/kg and 1.1 mg/kg in the surficial samples at station SED-8 and SED-2, respectively. Other PCB results in South Branch Creek were well below 1 mg/kg, and the deeper samples contained less than the shallower (0.5 foot) samples.

Overall, the Transect A Area contains slightly higher PCBs than the remainder of South Branch Creek. This pattern, and the presence of Aroclor 1254 (found upland), suggests that there could be a contribution from site sources, although, as discussed in Section 2.6.1, other sources have historically discharged to this area as well. Additionally, regional studies of the Newark Bay estuary, as discussed in Section 2.10, have shown PCBs to be ubiquitous at concentrations similar to those found in South Branch Creek. (see Figure 2, attached). These results indicate that while there is the possibility of PCB contributions to South Branch Creek in the furthest upland transects, ~~overall the PCB~~

~~impacts are not significantly elevated beyond regional conditions present throughout the Newark Bay estuary.~~

44. Page 6-27, Other metals - If available sulfides are limited, based on AVS/SEM ratios less than 1, then high total metal concentrations would result in higher bioavailability. Given this situation, further explanation is needed as to why the total concentrations of metals are of limited use in predicting bioavailability.

Original RP Response: The last paragraph in Section 6.6.2 will be modified to include the following text:

The total bulk concentration of metals is not useful in predicting the potential for bioavailability since concentrations of sulfides, which control bioavailability, vary. In fact, the sample with the highest total SEM (SED-B-1-0-0.5 in South Branch Creek, 0.27 $\mu\text{moles/g}$) is predicted to have minimal bioavailability due to high AVS, and, conversely, the samples in the Arthur Kill with low total SEM have low proportional AVS and therefore higher predicted bioavailability. Therefore, it appears as if the total concentration of metals is of limited use in predicting bioavailability and ecological risk in this system. Rather, the presence of sulfides, likely associated with fine-grained, depositional sediments, may be the controlling factor.

USEPA E-mail Response: Sediments with higher organic content may also have less bioavailable mercury. AVS alone does not tell the whole story. It's important to determine the concentration of metals. Other metals present in the system may compete for binding sites on the sulfide and/or organic matter compound, making it unavailable for binding with mercury.

2010 RP Response: IES agrees with USEPA that other factors may sequester mercury and affect its bioavailability. Note, however, that the AVS procedure evaluates the divalent metals on a total concentration, not individual metals, basis. Thus the ability of other metals to displace mercury is considered in the method. The language in the RI will be clarified as follows.

"The total bulk concentration of metals is not useful in predicting the potential for bioavailability since concentrations of sulfides, which control bioavailability, vary. In fact, the sample with the highest total SEM (SED-B-1-0-0.5 in South Branch Creek, 0.27 $\mu\text{moles/g}$) is predicted to have minimal bioavailability due to high AVS, and, conversely, the samples in the Arthur Kill with low total SEM have low proportional AVS and therefore higher predicted bioavailability. The AVS/SEM calculation is based on the total of divalent metals and therefore accounts for competition among individual metals for binding sites. In addition, other variables such as total organic carbon may bind metals. For these reasons, therefore, it appears as if the total concentration of metals is of limited use in predicting bioavailability and ecological risk in this system. Rather, the presence of sulfides and other ligands, likely associated with fine-grained, depositional sediments, may be the controlling factor."

2012 RP Response: It is our understanding the USEPA agrees with the 2010 statement above.

50. Page 6-37, Historic fill and Regional Constituents -The presence of arsenic in soil samples is attributed to the historic fill materials. However, the presence of arsenic in low marsh soils and sediment is attributed to unknown off-site sources. Please discuss and reconcile in the RI Report this inconsistency concerning the source(s) of arsenic.

Original RP Response: The attributability of the presence of arsenic in site soils to historic fill has been described throughout the report (see in particular language added to Section 6.2.2, referenced under the response to Comment 42). It is our recommendation that no further edits be made to this summary section.

USEPA E-mail Response: Please revise based on the April 29th conference call (and follow-up discussion) regarding Historic Fill.

2010 RP Response: Please refer to the response for specific comment on the executive summary #1.

2012 RP Response: The referenced language has been edited as follows.

"Other constituents that are not related to manufacturing activities at the site are frequently detected in the site soils, particularly in the anthropogenic fill. These include arsenic and other metals, PCDDs, PAHs and other organics, including chlorobenzenes. The ubiquitous presence of arsenic, other metals and PAHs in areas with no production history, the presence of anthropogenic fill, the absence of a decreasing concentration gradient within the fill, and the absence of an association with the known sources of contamination lead to the conclusion that the occurrences are not associated with LCP site operations; rather they are associated with the presence of anthropogenic fill materials and/or neighboring site operations as shown on Figure 6-48. Arsenic concentrations found in soil in the vicinity of the former Linde Hydrogen Plant, as well as the upstream areas of South Branch Creek, are elevated beyond the concentrations found typically throughout the site-wide anthropogenic fill material. Arsenic is not a site-related process chemical; however locations where arsenic concentrations are elevated beyond those found in anthropogenic fill are sufficiently co-located with process related contaminants and therefore would be subject to remediation."

Arsenic has been retained as a Contaminant of Potential Concern (COPEC) in the FS, and will be the subject of remediation.

55. Page 7-2, Volatilization, second paragraph: "When initially deposited, mercury is the most volatile, but is converted to more stable, less volatile form over time, so the significance of the volatilization pathway decreases." Again, biological processes have the ability to re-suspend gaseous elemental mercury, making it available for volatilization. Photoreduction of mercury may occur at the soil/sediment surface, converting Hg²⁺ forms to the volatile Hg⁰. In addition, plants may serve as conduits, uptaking mercury

from soils and potentially passing elemental mercury through the stomata to the atmosphere. All potential fate and transport mechanisms should be considered.

Original RP Response: Agreed. Additional clarification on the fate and transport processes has been included in a revised Section 7, as attached.

USEPA E-mail Response: Section 7.1.1 Volatilization: Only four soil gas samples were analyzed for total gaseous mercury. Where were these collected? In areas around the process buildings? It seems like a stretch to discount volatilization based solely on four samples. Also, although soil gas samples may indicate that volatilization is not an important pathway, visible elemental mercury remains in the soils/sediments, indicating that volatilization is an important transformation process.

2010 RP Response: The USEPA's comment is so noted and IES agrees that volatilization remains a complete fate and transport pathway at the site. However, the limited soils vapor data, some of which were biased towards areas of known elemental mercury, indicate that the degree of volatilization does not appear to indicate a significant exposure pathway.

2012 RP Response: It is our understanding the USEPA agrees with the 2010 statement above.

61. Page 7-8 6th paragraph "Net transport of mercury..." Wouldn't one expect that levels of Hg in surface water are orders of magnitude lower than found in sediments? It's unclear how that proves net transport via suspended particles is limited.

Original RP Response: This discussion has been edited for clarification in the revised Section 7, as attached. The migration of very low levels of mercury that suspend in surface water may be environmentally significant because mercury can be relevant in the environment at low concentrations. However, this pathway is unlikely to serve as a mechanism for moving or altering the bulk mass of mercury present in sediments. These points are captured in a revised Section 7, as attached.

USEPA E-mail Response: The paragraph remains the same in the revised Section 7. They need to edit the paragraph to reflect the response above.

2010 RP Response: The paragraph will be revised in Section 7 as follows:

"The migration of very low levels of mercury that suspend in surface water may be environmentally significant because mercury can be relevant in the environment at low concentrations. However, this pathway is unlikely to serve as a mechanism for moving or altering the bulk mass of mercury present in sediments."

2012 Response: It is our understanding the USEPA agrees with the 2010 statement above.

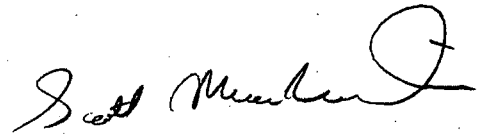
If you or your staff has any questions or comments, please do not hesitate to contact David McNichol of ISP ESI at 973-628-3355 or one of us at 201 574 4700.

Very truly yours,

Brown and Caldwell



Paul Thorn
Senior Scientist



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Enclosures

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			Modified text	OK	OK	2010 IES Response		EPA and IES appear in agreement – EPA to confirm	Further EPA review/ concurrence requested
Gen. Comment 1	2	Statements about off-site sources not well supported	Modified text	OK	OK		ü		
Gen. Comment 2	3	Evaluate groundwater as Class IIA unless formally reclassified by NJDEP	Groundwater reclassification petition for bedrock approved; overburden petition will be retracted and overburden concentrations will be evaluated as Class IIA	OK if NJDEP approves Alternate Groundwater Quality Criteria (AGWQC) for bedrock	NJDEP will not accept AGWQC so there will be no ARARs for bedrock groundwater	It has been agreed that the NJ Surface Water Quality Standards (Saline) will be used as default ARARs until a method to calculate the AGWQC has been developed		üResolved for overburden. NJ Surface Water standards will act as ARARs until method to develop AGWQC is developed.	
Gen. Comment 3	4	State whether delineation in specified medium is complete	Text example presented	OK but include groundwater data and ditch will need investigation	Additional information on off-site groundwater quality presented.	The ditch investigation was conducted in August 2011, the DRIR edits pertaining to the ditch results were provided in December 2011.			
Gen. Comment 4	5	State that RI will only address contamination as far as the Arthur Kill (Transect G)	Text insert presented	OK with one minor wording change	OK (but whether agencies pursue additional investigation not within IES control)		ü		
ES Comment 1	5	Site does not meet definition of historic fill	IES disagreed and requested discussion.	Revise response pursuant to 4/29/09 call	IES will eliminate the term "historic fill" from the RIR in interest of project progress but does not agree with NJDEP interpretation and reserves the right to pursue the issue in the future		ü		
ES Comment 2	6	Requested language changes (including regarding historic fill)	Text Inserts presented except historic fill	Revise historic fill response pursuant to 4/29/09 call	See above RE historic fill; no comments on other responses	Further language clarification provided that "secondary" COCs are collocated with mercury and exceed standards less frequently and to a lesser magnitude.		üConfirm other responses OK	
ES Comment 4[1]	7	Minor edit	Revised text presented	Request additional change.	OK		ü		
ES Comment 5	7	Minor edit	IES disagreed – retain language	OK			ü		
ES Comment 6	7	Minor edit	Revised text in accordance with General Comment No. 2.	OK			ü		
ES Comment 7	7	Minor edit	Revised text presented along with reference to revised Section 7	OK			ü		
ES Comment 8	8	Remove sentence referring to regional data	Revised text presented	OK			ü		
2	9	Correct typo	Correction will be made	OK			ü		
3	9	Specify wastewater treatment location	Text inserts presented	OK			ü		
4	10	Unclear whether unnamed ditch was sampled	Was not but should not affect remedy	Needs to be sampled	See Gen. Comment 3		ü		
5	10	Delete reference to non-potability of groundwater	Have original language remain and provide additional language.	OK			ü		
6	13	Mention Pralls Island wetlands	Text Insert and revised figure presented	OK			ü		
7	13	State all sample analytes	Text insert presented	OK			ü		
8	13	State number of borings	Text insert presented	OK			ü		
9	14	State whether delineation is complete	See response to General Comment 3	OK			ü		
10	14	Confusing language regarding salinity	Revised text presented	OK			ü		
11	14	Inconsistency on fill thickness	Revised text presented	OK			ü		
12	15	Inconsistency on aquitard thickness	Revised text presented	OK			ü		
13	15	Describe GAF groundwater extraction system	Text Inserts presented	Add details on containment wall.	Insert provided.			ü EPA needs to approve revision	

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								EPA and IES appear in agreement – EPA to confirm	Further EPA review/ concurrence requested
14	17	Tidal Influence in bedrock unclear		OK but add contour map for high and low tide	Data not available for these maps; clarifying language presented	Request final approval of edit from EPA		ü EPA needs to approve revision	
15	18	State that extraction system capture is unclear	Text inserts presented to confirm sufficient evidence	EPA does not fully agree	Additional Inserts presented	Request final approval of edit from EPA			EPA needs to approve revisions
16	21	Arthur Kill flow direction varies	Revised text presented	OK			ü		
17	22	Need to screen against impact to groundwater values	Not relevant since groundwater was analyzed	Still need to use them	Will add these screening levels; revised text presented	Reiterate 2010 Response as appropriate.		ü EPA needs to approve revision	
18	23	Add sections on COCs and screening criteria	Already presented in sections so not needed	OK			ü		
19	23	Inconsistency on mercury migration description	Revised text presented	OK	OK		ü		
20	24	Clarify speciation discussion	Revised text presented	OK	Additional correction		ü		
21	25	Clarify TCPL discussion	Clarification on hazardous waste status provided; Section 7 will address	OK but needs to verify no listed hazardous waste other than the closed RCRA unit	Per 8/13/109 conference call response is acceptable		ü		
22	26	Acknowledge additional mercury transport mechanisms	Text insert presented	OK			ü		
23	26	Acknowledge additional mercury transport mechanisms	Text insert presented	OK			ü		
24	27	Need justification for off-site sources of arsenic	Text insert presented	Insert is OK but unconvinced no arsenic sources and should stay as COPC in the human health risk assessment	Arsenic was a COPC in the HHRA			ü EPA needs to confirm no additional language required	
25	28	Relevance of TSCA PCB standard questioned	NUNRSRS is presented in report and TSCA standard for reference only	OK			ü		
26	28	Discuss barium	Text insert presented	OK with minor revision	OK		ü		
27	29	Clarify TCDD as 2,3,7,8 Isomer	Revised text presented	OK			ü		
28	29	Clarify and expand CDD/CDF discussion	Text insert presented	EPA unconvinced that CDDs/CDFs are regional[12]	8/25/09 memorandum submitted expanding on the issue; CDDs not associated with chlor alkali facilities	EPA Agrees.			Consensus on language required
29	30	Add vapor screening level for Hg	Text insert presented and will be added to Table	OK			ü		
30	31	List VOCs over vapor screening levels	Text insert presented	OK			ü		
31	31	Indicate precedent for AGWQC	They have been but methodology no longer acceptable to NJDEP; see General Comment 2	OK			ü		
32	31	AGWQC need to be protective	See General Comment 2	OK			ü		
33	32	Justify off-site bedrock groundwater source	Text added in response to General Comment 15	OK			ü		
34	32	Are filtered and unfiltered lab results mixed up?	No evidence they were	OK			ü		
35	32	Correct arsenic contradiction	Revised text presented	OK			ü		
36	32	VOCs could be site related	Revised text presented	Additional info would be required to prove off-site origin	Comment noted along with confirmation that VOCs were included in the HHRA and Ecological Risk Assessment (ERA)	EPA Agrees.			Consensus on language required
37	33	Provide turbidity in CDD/CDF groundwater sample	Text insert presented	Delete "likely" and replace with "may be"	OK		ü		

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								EPA and IES appear in agreement - EPA to confirm	Further EPA review/ concurrence requested
38	34	Delete sentence	Was provided for perspective	Still confused	Will delete		ü		
39	34	Include human health-based surface water standards	Will be added to relevant tables but per EPA no fish consumption pathway in HHRA	EPA will be requesting information on that pathway in the HHRA ¹	No consumable fish in SBC. Column added to table(s).	EPA Agrees.		ü	Consensus on language required
40	35	Revise Hg methylation statements	Revised text presented	Small amounts of methylation can be important and cannot dismiss methyl Hg as a COPC ¹	Was included in the risk assessments	EPA Agrees.		ü EPA needs to confirm no additional language required	Consensus on language required
41	36	Clarify use of "human refusal" to determine sediment depth	Additional explanation presented	OK			ü		
42	36	Add information on off-site arsenic sources	Text insert presented	OK			ü		
43	37	Justify conclusion of no PCB problem in South Branch Creek	Recommend no additional discussion	Based on PCB concentrations, more discussion required[1]	Revised text presented	Final text edited.			EPA needs to approve revisions
44	38	Clarify AVS/metals bioavailability statements	Text insert presented	Other factors also control bioavailability	Additional text insert presented	EPA Agrees.			Consensus on language required
45	39	Clarify whether biota are consumed whole	Text insert presented	OK			ü		
46	40	Wrong word	Correction will be made	OK			ü		
47	40	Arsenic comment is speculative	Text insert presented	Ok with minor deletion[3]	OK		ü		
48	41	Clarify explanation for observed BSAFs	Revised text presented	OK			ü		
49	43	Include barium	Revised text presented (see General Comment 48)	OK			ü		
50	44	Arsenic/historic fill inconsistency	IES disagreed	Revise per 4/29/09 call	See Response to Executive Summary Comment 1	Provided revised section 6.9.1 text			Consensus on language required
51	44	Add chlorobenzene language	Text insert presented	OK			ü		
52	45	AGWQC are unacceptable	see General Comment 2	OK			ü		
53	45	Support drainage statement	Text insert presented	Probably accurate			ü		
54	45	Add site-specific component to transport discussions	Addressed in revised Section 7	OK			ü		
55	46	Hg may be transformed to volatile forms	Revised Section 7	Elemental Hg indicates volatilization is an important pathway	IES acknowledged elemental Hg presence but data indicate pathway not significant	EPA Agrees.			Consensus on language required
56	46	Bacteria can methylate Hg	Revised Section 7	OK			ü		
57	47	Present source of off-site Hg	Agreed - see revised Section 7 and response to Gen. Comment 15	OK			ü		
58	47	Cite fish and crab data here	Agreed	OK			ü		
59	47	Present source of off-site Hg	Agreed - see revised Section 7 and response to Gen. Comments 13 and 33	OK			ü		
60	47	Acknowledge current potential for Hg transport to SBC	Most loading historical	OK if acknowledge most but not all	OK		ü		
61	48	Small amounts of Hg suspended in surface water may be important	Text presented for Section 7	Text not revised per comment	New text presented	EPA Agrees.		ü	Consensus on language required
62	48	Delete reference to interim action	OK to mention per 2/10/09 meeting; text insert presented	OK			ü		

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			March 2009 IES Response to January 2009 EPA Comment	EPA Follow-up Comment September 2009	2010 IES Response	2012 IES Response			
63	49	Include groundwater flow discussion and cross-sections	Discussion appears in Section 9.4; cross-sections not presented due to minimal migration	OK – see response to General Comment 64			ü		
64	49	Statement regarding lack of off-site groundwater migration incorrect	Text insert presented	OK if remove "significant" and provide evidence of GAF well capture	OK		ü		
65	50	Define surface soil depth and modify RAOs per FS meetings	OK	OK			ü		
66	50	Table title is incorrect	Title is correct	OK			ü		
67	51	Show contouring data	Revised Figure 5-2 with data attached	OK			ü		
68	51	Elevation data discrepancy	Revised Figure 5-3 attached	OK			ü		
69	51	Elevation data discrepancy	Revised Figure 5-4 attached	OK			ü		
70	51	A'-A'- revisions requested	Revised cross section attached	OK			ü		
71	51	Anomalies on contour map	Well MW- 15S omitted due to anomalies; MW- 8S matches (Figure 5-6)	OK			ü		
72	52	Anomalies on contour map	Well MW- 15S omitted due to anomalies	OK			ü		
73	52	Anomalies on contour map	Well MW- 15S omitted due to anomalies	OK			ü		
74	52	Add GAF pumping wells	GAF pumping well DEW- 4A has been included on Figure 5- 11 (attached)	OK			ü		
75	52	Clarify contour lines	Revised Figures 5- 12 and 5- 13 attached with clarifications	OK			ü		
76	53	Add Isoconcentration contours on groundwater contaminant maps	Revised Figures 6-18a, 18c, 20a, 20c, 22a, 22b, 23a, and 23b attached	OK			ü		
77	53	Include total mercury values and cross-references in Table 6-5	Revised Table 6-5 attached	OK			ü		
78	53	Define acronyms in Table 6-15	Will be defined in final RIR	OK			ü		
79	53	Unit error for percent solids	Will be corrected in final RIR	OK			ü		
80	54	Table 6-17 missing	Table will be included	OK			ü		

[1] There is no ES Comment 3.

[2] Some EPA comments interspersed with response text

[3] Some EPA comments interspersed with response text